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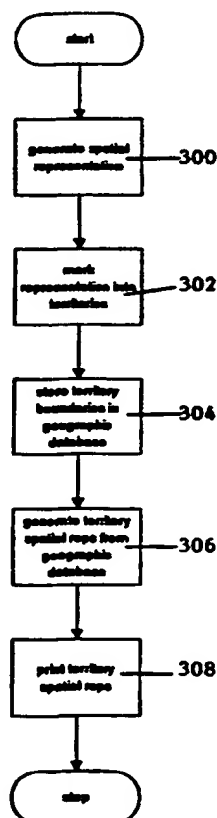
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[Continued on next page]

(54) Title: METHOD AND SYSTEM FOR MAINTAINING GEOGRAPHIC DATA



(57) Abstract: The invention provides a method of maintaining geographic data comprising the steps of retrieving from a data memory a first group of data comprising one or more data sets representing geographic data, each data set comprising one or more data items; compiling a second group of data comprising one or more data sets representing geographic data, each data set comprising one or more data items; and generating one or more spatial representations based on the first and/or second groups of data. The first group of data is preferably obtained from a national geographic database and the second group of data is preferably obtained from a further data store. The invention also provides a related system and computer program.

WO 01/22281 A1



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METHOD AND SYSTEM FOR MAINTAINING GEOGRAPHIC DATA**FIELD OF INVENTION**

- 5 The invention relates to a method and system for maintaining geographic data.

BACKGROUND TO INVENTION

- 10 It is not uncommon for a person to change residential address and it is not uncommon for the same person to change address annually or even more frequently. Dwellings are continually altered, for example, old warehouses are turned into apartments, existing houses and buildings are demolished and new buildings are erected. Local body regulations and rules permit local bodies to create new subdivisions, rename existing subdivisions and to make other formal changes to
15 addresses.

- In New Zealand, for example, there are approximately 1,290,000 unique addresses. 1,200,000 of these are stored in one single database. It is estimated that of the addresses stored in this database, only 70% are correct. For the reasons stated
20 above, it is a difficult task to compile and maintain an accurate and current address database.

- The lack of a definitive address database causes difficulties for organisations such as postal delivery services in the processing and delivery of mail. Similar difficulties are
25 also experienced by emergency services, for example the fire service, ambulance service, and the police.

SUMMARY OF INVENTION

- 30 In broad terms in one form the invention comprises a method of maintaining geographic data comprising the steps of retrieving from a data memory a first group of data comprising one or more data sets representing geographic data, each data set comprising one or more data items; compiling a second group of data comprising one or more data sets representing geographic data, each data set comprising one or
35 more data items; and generating one or more spatial representations based on the first and/or second groups of data.

- In another form in broad terms the invention comprises a geographic data maintaining system comprising a retrieval device arranged to retrieve from a data memory a first group of data comprising one or more data sets representing geographic data, each data set comprising one or more data items; a second group of data comprising one or more data sets representing geographic data, each data set comprising one or more data items; and a representation generator arranged to generate one or more spatial representations based on the first and/or second groups of data.
- 10 In another form in broad terms the invention comprises a geographic data maintaining computer program comprising a retrieval device arranged to retrieve from a data memory a first group of data comprising one or more data sets representing geographic data, each data set comprising one or more data items; a second group of data comprising one or more data sets representing geographic data,
- 15 each data set comprising one or more data items; and a representation generator arranged to generate one or more spatial representations based on the first and second groups of data.

BRIEF DESCRIPTION OF THE FIGURES

Preferred forms of the method and system for maintaining geographic data will now be described with reference to the accompanying figures in which:

5

Figure 1 shows a block diagram of a system in which one form of the invention may be implemented;

10

Figure 2 shows the preferred system architecture of hardware on which the present invention may be implemented;

Figure 3 is an example geographic database;

15

Figure 4 illustrates a preferred method of maintaining data in the geographic database;

Figure 5 shows a typical representation generated by the system; and

20

Figure 6 illustrates a method of data checking based on matches and partial matches.

DETAILED DESCRIPTION OF PREFERRED FORMS

25

Figure 1 illustrates a block diagram of the preferred system 10 in which one form of the present invention 12 may be implemented. The system includes one or more clients 20, for example 20A, 20B, 20C, 20D, 20E and 20F, which each may comprise a personal computer or workstation described below. Each client 20 is interfaced to the invention 12 as shown in Figure 1.

30

Each client 20 could be connected directly to the invention 12, could be connected through a local area network or LAN, could be connected through the Internet, or could be connected through a suitable wireless application protocol or WAP. Clients 20A and 20B, for example, are connected to a network 22, such as a local area network or LAN. The network 22 could be connected to a suitable network server 24

35

and communicate with the invention 12 as shown. Client 20C is shown connected directly to the invention 12. Clients 20D, 20E and 20F are shown connected to the

invention 12 through the Internet 26. Client 20D is shown connected to the Internet 26 with a dial-up connection and clients 20E and 20F are shown connected to a network 28 which is in turn connected to a suitable network server 30.

- 5 The preferred system 10 comprises a geographic database 36 further described below and preferably further comprises one or more other geographic databases. These databases could comprise data compiled from two or more different sources. The data sources could include a national geographic database 40, a local knowledge base for example a "postie walk book" 50, one or more regional geographic databases
10 60 and/or a post code database 70.

One preferred form of national geographic database 40 is the digital cadastral database (DCDB) maintained by Land Information New Zealand (LINZ). The DCDB is a computer register containing data on land parcels throughout New Zealand. It
15 represents the geographic location, shape, area, land appellation and street address for each land parcel and the legal definition of roads, road centrelines, railways and hydrographic features. The DCDB also contains the definition of statistical meshblocks and derived administration boundaries, such as local authorities and electoral districts.

20 The DCDB has three major components, a spatial component which includes all coordinate and graphical information, an attribute component which contains descriptive information, and a topology component which contains information on topology or connectivity of the graphical data.

25 The DCDB contains data obtained by digitising existing large scale cadastral record maps and from Electoral Record Maps (ERM) which provide street address and unique meshblock identifiers. Electoral Record Maps record a house number where allocated and a street name as listed in the Authoritative Streets and Places (ASP)
30 database. The ASP database contains listings of street and place names for New Zealand with respect to their location within a local authority, or electoral district.

The DCDB contains street address information in a format conforming with standards adopted by individual local authorities. Street names are stored in a
35 format compatible with the Authoritative Streets and Places (ASP) database compiled

for electoral purposes. Building and property names are not recorded in the DCDB as there are no standards which have been adopted nationally by local authorities.

5 In addition to national geographic database 40, the preferred system could further
comprise one or more regional geographic databases 60. It is the practice of local
authorities to compile their own databases from the national geographic database
and to store additional data in these databases. For example, a local authority may
approve a new sub-division and store details of the sub-division in a regional
geographic database. The regional geographic databases may contain data not
10 contained in the national geographic database. Likewise, the national geographic
database may contain data not contained in the regional geographic databases.

The system 10 may also include a post code database 70. A typical post code
database contains the data representing individual street name and locations,
15 together with the post code corresponding to that street name or location. The
database 70 may additionally contain details of the post office box number or private
bag number, together with the post code of that post office box or private bag
number. Additionally, the database 70 may include the post code corresponding to a
particular suburb.

20 A post code database 70 would be useful, for example, where the geographic co-
ordinates of an address are not known. Using the post code database 70, the post
code of the address can be determined and the geographic coordinates of that
postcode can be determined, giving the approximate geographic coordinates of that
25 address. It will be appreciated that the post code database 70 may be substituted for
an equivalent database, for example a database which stores details of zip codes
where appropriate.

The system may also include a local knowledge base 50. It is not uncommon for
30 certain groups of people to have detailed records of a particular geographic region.
One example is postal delivery personnel. Each employee typically delivers mail to
recipients on a postal route. Each postal route is recorded manually in a "postie
walk book". A walk book typically contains a list of the addresses on a postal route,
the names of residents on that route and additional information about each address.
35 For example, addresses are graded on the basis of delivery difficulty, using a scale of
1-4, a 1 indicating an easy address to walk or find and 4 being a difficult to walk or

find. The postie walk book may also include warnings of hazards, such as aggressive animals or residents. The walk books 50 could be stored either manually or electronically in a database.

5 Other groups of people have similar detailed knowledge of particular areas, for example taxi drivers, charity collection agencies, door-to-door sales people and advertising circular delivery people. The detailed knowledge available to these groups of people would greatly increase the accuracy and integrity of the natural database if the knowledge could be captured effectively.

10

It will be appreciated that the individual databases 36, 40, 50, 60 and 70 components of the database could be installed on a single standalone computer or could be stored on one or more servers accessible over a network or over the Internet. Any of the databases could also be made available to the system 10 through peer-to-peer file sharing in which the invention 12 provides access to network addresses for different sets of data.

One preferred form of the invention 12 comprises a personal computer or workstation operating under the control of appropriate operating and application software, having a data memory 80 connected to a server 90. The invention is arranged to retrieve data from the databases 36, 40, 50, 60 and 70, compare data retrieved from these different sources, to display data on a client workstation 20 and/or update data in one or more of the databases.

25 Figure 2 shows the preferred system architecture of a client 20 or invention 12. The computer system 100 typically comprises a central processor 102, a main memory 104 for example RAM, and an input/output controller 106. The computer system 100 also comprises peripherals such as a keyboard 108, a pointing device 110 for example a mouse, track ball or touch pad, a display or screen device 112, a mass storage memory 114 for example a hard disk, floppy disk or optical disc, and an output device 116 for example a printer. The system 100 could also include a network interface card or controller 118 and/or a modem 120. The computer system 100 could also include WAP communication protocol apparatus. The individual components of the system 100 could communicate through a system bus 122.

35

Figure 3 shows a representation of a preferred form geographic database 36. The database forming the geographic database 36 could be implemented using a number of different products, for example, Oracle, Sybase, Informix, DB2, Microsoft SQL Server, or Microsoft Access. The database shown in Figure 3 is a relational database
5 having a number of records, each record having a number of fields. Each record comprises a data set and the data in each field comprises a separate data item. Each data set represents a geographic location or street address stored in the geographic database.

10 As shown in Figure 3, the preferred geographic database 36 contains a number of different data items in each data set, for example a street number 200, a street name 202, a street type 204, a suburb 206 and a city 208. It is envisaged that where appropriate the geographic database could also include a zip code, post code, state and/or country. Each data set is preferably uniquely identified by a record identifier
15 210.

The geographic database may also include geographic co-ordinates. The geographic co-ordinates shown in Figure 3 include x co-ordinates 212 and y co-ordinates 214 representing the geographic position of each street address as a latitude or longitude,
20 or in a suitable local map co-ordinate system.

The geographic database is preferably initially created from at least part of the national geographic database 40. As will be described below the geographic database is enriched with data from other sources.
25

The term "street address" as used in the specification includes the geographic address of rural areas, public facilities, for example schools and hospitals, and area units, for example suburbs and cities. The address of a large area may, for example, be stored as the centroid of that large area. It is also envisaged that the geographic
30 database may include data representing postal boxes and rural delivery points.

Figure 4 illustrates one method of capturing and maintaining data in accordance with the invention. As indicated at 300, one or more data sets representing geographic locations are retrieved from, for example, the national geographic
35 database 40 itself or an initial copy stored in the geographic database 36. A spatial representation of the geographic data is generated through the output device 112.

The spatial representation is preferably a topographical map. The spatial representation could further include data originally sourced from geographic database 36, national geographic database 40, regional geographic databases 60, post code database 70 and/or walk books 50.

5

The spatial representations or maps are supplied to personnel with a detailed knowledge of the geographic area, for example, postal workers. As shown at 302, each postal worker draws or marks out his or her territory on the map. Each territory represents the delivery area for which the postal worker is responsible.

10

As indicated at 304, the territory boundaries are stored in the geographic database 36. Preferably, the territory is represented by a series of boundary points connected by lines. The coordinates of each boundary point are determined, and these boundary points are stored in the geographic database. The set of boundary points could be indexed, for example, by a postal worker identifier.

15

As indicated at 306, spatial representations or maps of each territory are then generated and printed through output device 112 as indicated at 308. The territory maps are generated, for example, by retrieving the set of boundary points for a particular postal worker and generating a spatial representation of geographic data sets positioned within the territory boundary.

20

Territory maps are then supplied to each postal worker who would then ground truth the geographic data against their local knowledge and manual records. It is envisaged that postal workers will mark any changes to addresses on their territory maps and these changes could be stored in the geographic database 36. In a similar manner, it is envisaged that regular updates from databases 40, 50, 60 and 70 would be transferred or otherwise made available to the geographic database 36, and so maps generated from the geographic database will represent the new data.

25

30

Figure 5 illustrates a typical territory map generated from the geographic database. The territory of the postal worker is indicated at 400. Postal addresses within the territory 400 are indicated for example at 402.

35

Preferably the postal worker marks the actual route travelled within the territory, for example by indicating starting point 404, finish point 406, and the route travelled

indicated by a series of directional lines 408. This information could be captured and stored in the geographic database 36, for example by storing a set of points along a postal route, together with the geographic coordinates of those points, and directional vectors connecting each point. It will be appreciated that the storage of route data is valuable when reorganising a route within a territory to ensure optimum efficiency, or when altering the size of the territory and marking a new route through the revised territory.

A preferred form of the invention is arranged to compare geographic data from the geographic database with geographic data from further sources, for example the postie walk book(s) 50. One method of matching the respective data sets is described in our PCT patent application PCT/NZ00/00148 to Compudigm International Limited filed on 3 August 2000 and entitled "Method and system for matching data sets". The preferred method forms an exact or partial match comparison of the data in the geographic database 36 with the data in, for example, the postie walk book 50. The method further comprises the steps of compiling a list of data sets which are contained in the geographic database but not the postie walk book and compiling a list of data sets which are contained in the postie walk book but not the geographic database.

As indicated at 500 in Figure 6, a first group of data comprising one or more data sets is retrieved from the geographic database. A match rule is retrieved from a rule base as indicated at 502. The match rules are described in more detail in PCT/NZ00/00148. These match rules permit address records in the geographic database 36 to be compared with geographic records in other databases, for example, the postie walk book 50.

The match rules generally specify one or more data items in a data set from the geographic database and one or more data items in a data set from another database to be compared. Preferably the specified data items from, for example, the geographic database data set are concatenated into a single string, and the single string is then searched for individual data items from a data set from another database. The rule returns a match or partial match if a significant portion of data items from the geographic database record matches the data items in the other data record. The system could return a ranking indicating the extent of the match which could also serve as a threshold for the match.

The order in which the data items appear in the concatenated string is generally unimportant, meaning that the system is able to match data sets where data items are either missing or specified incorrectly. For example, the suburb data field could
5 be specified in the city data field, or the data in the suburb field may have been transposed with the data in the city field. Matching concatenated data items in this way would overcome these difficulties in the user data.

10 A second group of data comprising one or more data sets representing geographic data from another database for example the walk book 50 is then retrieved, for example, from the postie walk book 50 as indicated at 504. As indicated at 506, the match rule retrieved from a rule base is applied to compare the address in the first group of data with the address record in the second group of data. As shown at 508,
15 if the match rule is satisfied, the geographic record could be added to a candidate list as shown at 510.

As shown at 512, if there is another geographic record to compare, the next geographic record is retrieved as indicated at 504. If there is another rule in the rule base to apply as indicated at 514, the next match rule is retrieved from the rule base
20 at 502.

As shown as 516, if there is another address record in the geographic database to check, the address record is retrieved from the geographic database as indicated at 500.
25

As shown at 518, a list is compiled of data sets from the first group of data which do not match any data set from the second group of data. In this way, data which is stored in the geographic database 36 but is not stored in a postie walk book 50 can be allocated to a postal worker to verify any changes or additions to be made to the
30 postie walk book(s) 50.

As shown at 520, a list is compiled of data sets from the second group of data which do not match any data set from the first group of data. In this way, address data which is stored in a postie walk book 50 but is not stored in the national geographic
35 database 40 can be used to update the national geographic database 40.

In each case, the list could be compiled by identifying the geographic data from the geographic database which does not appear in the candidate match list calculated at 510 or by identifying the geographic data from the postie walk book 50 which does not appear in the candidate match list calculated at 510. The lists compiled at 518
5 and 520 are preferably stored in memory 80.

The invention provides a method and system of maintaining a definitive address database using data obtained from a number of sources. The invention may be used to define and manage postal delivery areas and to test out new scenarios for the
10 arrangement of the delivery areas to maximise efficiency.

The data in the geographic database can be used as a dynamic information source for day-to-day use of operational and managerial personnel. It can be kept current on an on-going basis by ensuring that postal workers carry a current map with them
15 and make notes of any address changes so that these changes can be entered into the geographic database.

The geographic database could be made available to various emergency services, for example, the fire service, ambulance service, and police. The data could also be
20 made available to third parties for the purposes of direct marketing opportunities. These third parties could include retailers, banking and financial institutions, mail order firms, communication companies, councils and credit providers.

The foregoing describes the invention including preferred forms thereof. Alterations
25 and modifications as will be obvious to those skilled in the art are intended to be incorporated within the scope hereof.

CLAIMS:

1. A method of maintaining geographic data comprising the steps of:
retrieving from a data memory a first group of data comprising one or more
5 data sets representing geographic data, each data set comprising one or more data
items;
compiling a second group of data comprising one or more data sets
representing geographic data, each data set comprising one or more data items; and
generating one or more spatial representations based on the first and/or
10 second groups of data.
2. A method of maintaining geographic data as claimed in claim 1 further
comprising the step of compiling a list of data sets from the first group of data which
do not match any data set from the second group of data.
15
3. A method of maintaining geographic data as claimed in claim 1 or claim 2
further comprising the step of compiling a list of data sets from the second group of
data which do not match any data set from the first group of data.
- 20 4. A method of maintaining geographic data as claimed in claim 2 or claim 3
wherein a first data set matches a second data set if all data items of the first data
set are members of the second data set.
5. A method of maintaining geographic data as claimed in any one of the
25 preceding claims further comprising the step of retrieving the second group of data
from a manual source.
6. A method of maintaining geographic data as claimed in any one of claims 1
to 4 comprising the step of retrieving the second group of data from a data memory.
30
7. A method of maintaining geographic data as claimed in claim 6 wherein the
data items of one or more data sets comprise character strings.
8. A method of maintaining geographic data as claimed in claim 7 further
35 comprising the steps of concatenating the user data items into a single string and
performing match comparisons based on string comparisons.

9. A method of maintaining geographic data as claimed in any one of the preceding claims wherein one or more of the data sets represent street addresses.
- 5 10. A method of maintaining geographic data as claimed in any one of the preceding claims wherein one or more of the data sets represent postal addresses.
11. A geographic data maintaining system comprising:
a retrieval device arranged to retrieve from a data memory a first group of
10 data comprising one or more data sets representing geographic data, each data set comprising one or more data items;
a second group of data comprising one or more data sets representing geographic data, each data set comprising one or more data items; and
a representation generator arranged to generate one or more spatial
15 representations based on the first and/or second groups of data.
12. A system as claimed in claim 11 further comprising a list of data sets from the first group of data which do not match any data sets from the second group of data.
- 20 13. A system as claimed in claim 11 further comprising a list of data sets from the second group of data which do not match any data set from the first group of data.
- 25 14. A system as claimed in claim 12 or claim 13 wherein a first data set matches a second data set if all data items of the first data set are members of the second data set.
15. A system as claimed in any one of claims 11 to 14 wherein the second group
30 of data is compiled from a manual source.
16. A system as claimed in any one of claims 11 to 14 wherein the second group of data is retrieved from a data memory.
- 35 17. A system as claimed in claim 16 wherein the data items of one or more data sets comprise character strings.

18. A system as claimed in claim 17 further comprising a data matcher arranged to concatenate data items into a single string and to compare data items based on string comparisons.

5

19. A system as claimed in any one of claims 11 to 18 wherein one or more of the data sets represent street addresses.

10

20. A system as claimed in any one of claims 11 to 19 wherein one or more of the data sets represent postal addresses.

15

21. A geographic data maintaining computer program comprising:
a retrieval device arranged to retrieve from a data memory a first group of data comprising one or more data sets representing geographic data, each data set comprising one or more data items;
a second group of data comprising one or more data sets representing geographic data, each data set comprising one or more data items; and
a representation generator arranged to generate one or more spatial representations based on the first and second groups of data.

20

22. A computer program as claimed in claim 21 further comprising a list of data sets from the first group of data which do not match any data set from the second group of data.

25

23. A computer program as claimed in claim 21 or claim 22 further comprising a list of data sets from the second group of data which do not match any data set from the first group of data.

30

24. A computer program as claimed in claim 22 or claim 23 wherein a first data set matches a second data set if all data items of the first data set are members of the second data set.

35

25. A computer program as claimed in any one of claims 21 to 24 wherein the second group of data is compiled from a manual source.

26. A computer program as claimed in any one of claims 21 to 24 wherein the second group of data is retrieved from a data memory.
27. A computer program as claimed in claim 26 wherein the data items of one or
5 more data sets comprise character strings.
28. A computer program as claimed in claim 27 further comprising a string comparator arranged to concatenate the data items into a single string and match each data item to other data items based on string comparisons.
10
29. A computer program as claimed in any one of claims 21 to 28 wherein one or more of the data sets represent street addresses.
30. A computer program as claimed in any one of claims 21 to 29 wherein one or
15 more of the data sets represent postal addresses.
31. A computer program as claimed in any one of claims 21 to 30 embodied on a computer-readable medium.

1/6

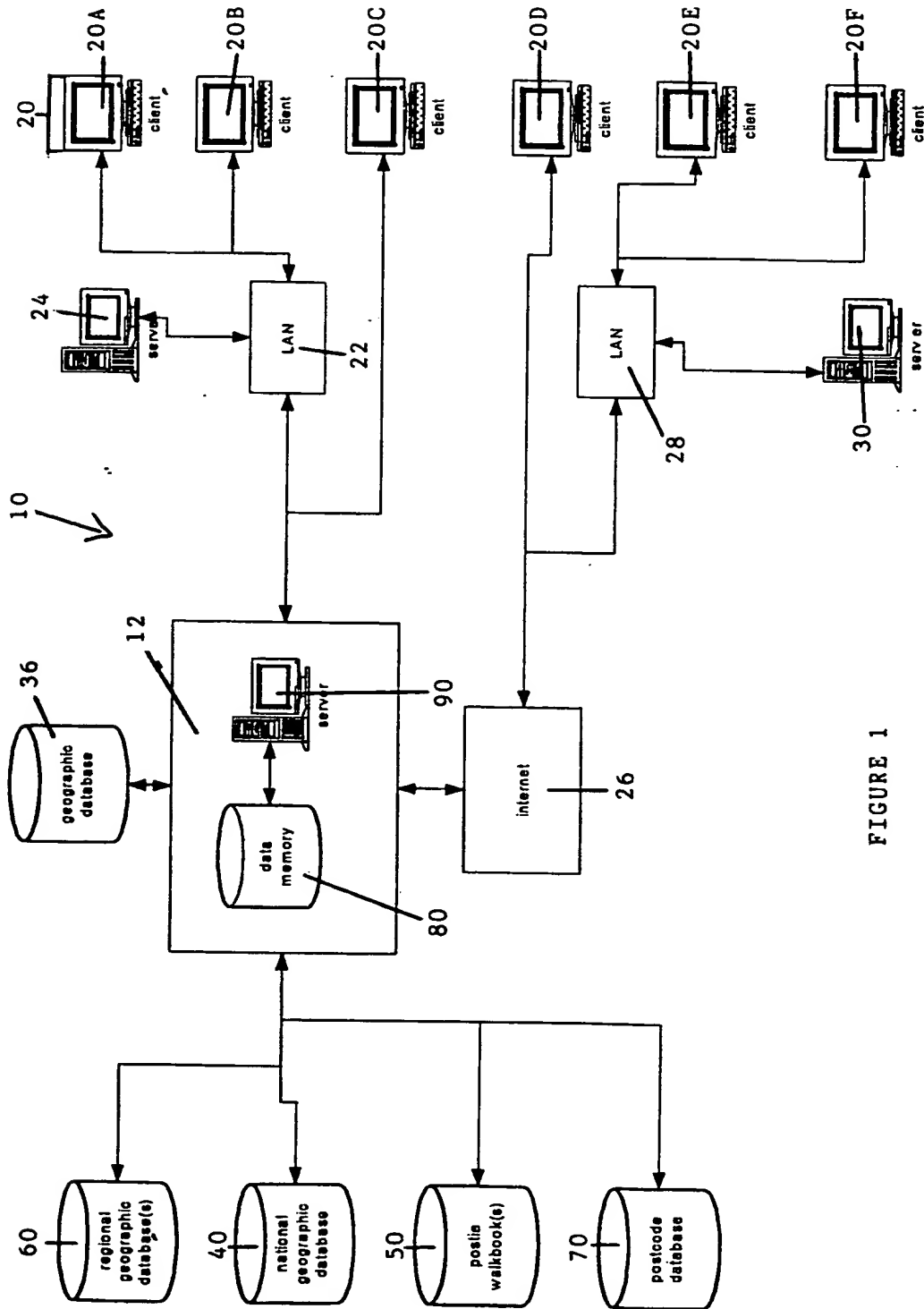


FIGURE 1

2/6

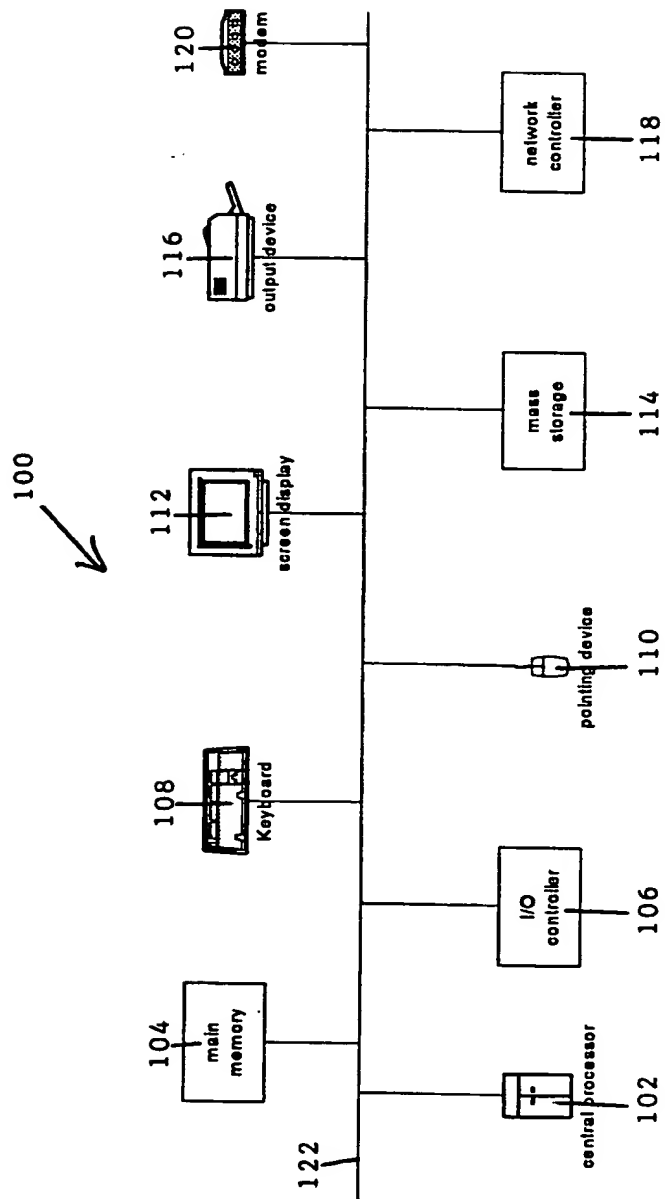


FIGURE 2

3/6

ID	num	street_name	street_type	suburb	city	x	y
1	34	Percy Dyett	Drive	Karori West	Wellington	2654580.36	5990107.25
2	10	Rawson	Street	Linden	Wellington	2663654.08	6003561.06
3	15	Oldham	Way	Chartwell	Wellington	2657532.39	5992474.43
4	8	Egmont	Street	Te Aro	Wellington	2658867.56	5988943.72
5	58	Bell	Street	Linden	Wellington	2664066.32	6004470.28
6	24	St John	Street	Kelburn	Wellington	2658035.97	5988702.39
7	11	Mission	Street	Fairfield	Lower Hutt	2671975.57	5996667.81
8	18	Nile	Street	Waterloo	Lower Hutt	2671563.22	5997458.10
9	26	South	Street	Avalon	Lower Hutt	2668406.71	5996591.05
10	2	Fleet	Grove	Korokoro	Lower Hutt	2666165.85	5996781.01
11	28	Waddington	Drive	Fairfield	Lower Hutt	2672928.45	5998318.50
12	0	Compudigin International			Wellington	2658630	5988710
13	0	Cuba Street & Dixon Street		Te Aro	Wellington	2658779.30	5989045.80
14	0			Oriental Bay	Wellington	2660380	5989050
15					Wellington	2658630	5988710

FIGURE 3

4/6

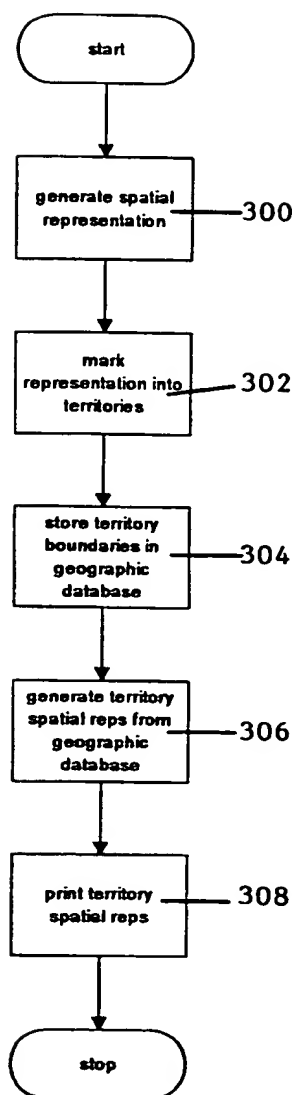


FIGURE 4

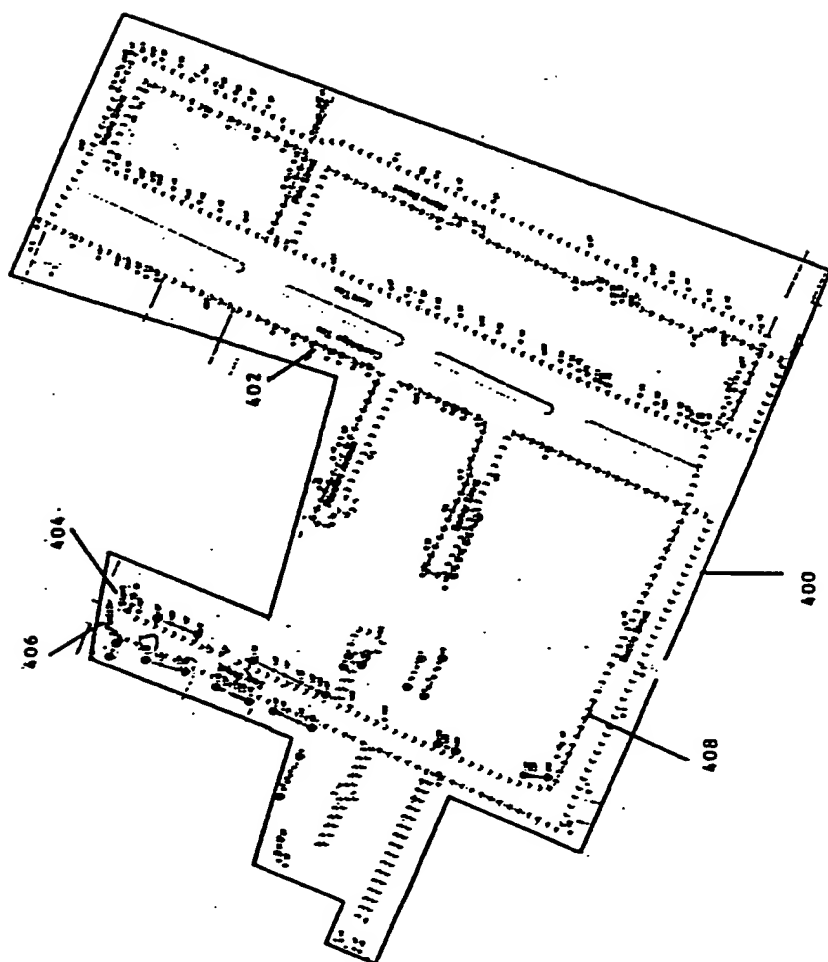


FIGURE 5

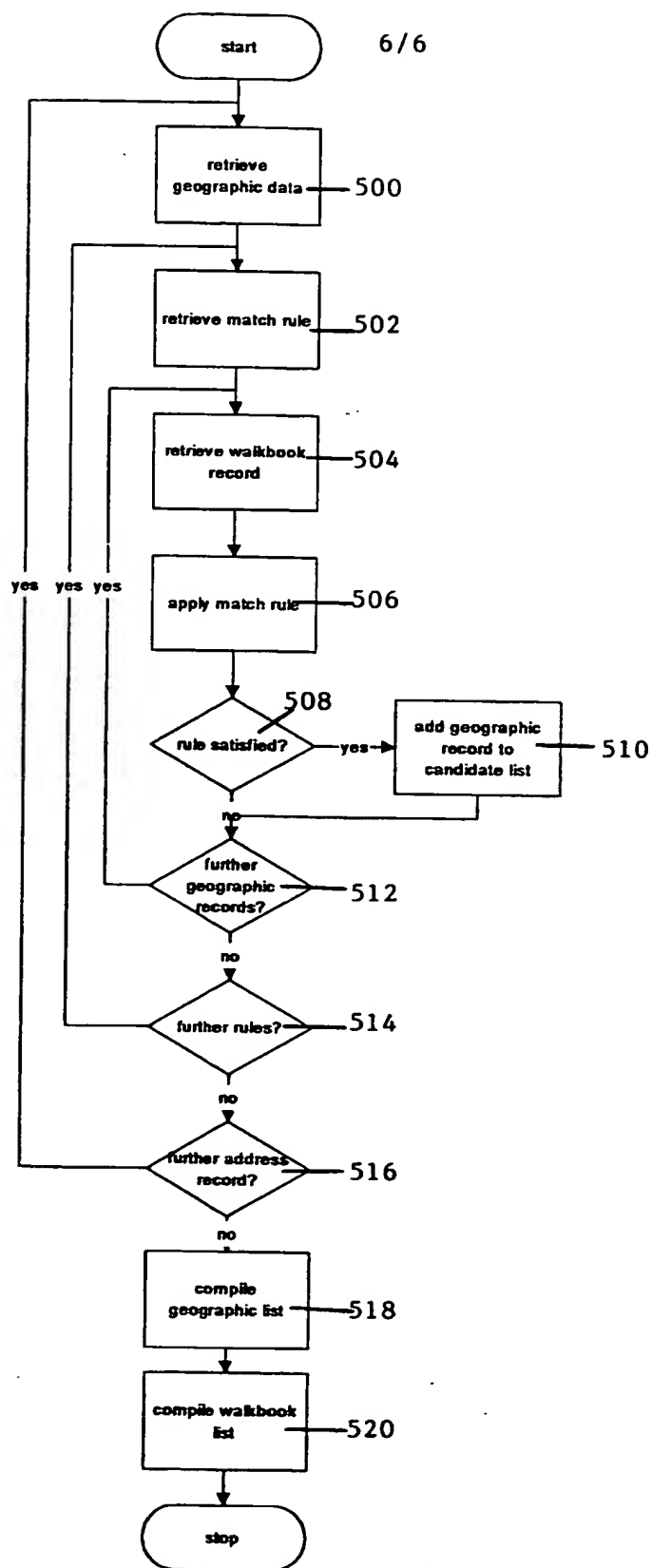


FIGURE 6

INTERNATIONAL SEARCH REPORT

International application No.
PCT/NZ00/00184

A. CLASSIFICATION OF SUBJECT MATTER		
Int. Cl. ⁷ : G06F 17/30		
According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED		
Minimum documentation searched (classification system followed by classification symbols) IPC: AS ABOVE		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) WPAT(geograph+, data)		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 953 722 (Lampert et al.) 14 September 1999 Whole document	1,2,11,12,21,22
Y		1-31
X	US 5 948 040 (DeLorme et al.) 7 September 1999 Abstract, figures, claims	1,2,11,12,21,22
X	EP 860 787 (Kokusai Denshin Denwa Co., Ltd.) 26 August 1998 Whole document	1,11,21
<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C <input checked="" type="checkbox"/> See patent family annex		
<p>* Special categories of cited documents:</p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier application or patent but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> <p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone</p> <p>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art</p> <p>"&" document member of the same patent family</p>		
Date of the actual completion of the international search 12 December 2000		Date of mailing of the international search report 14 DEC 2000
Name and mailing address of the ISA/AU AUSTRALIAN PATENT OFFICE PO BOX 200, WODEN ACT 2606, AUSTRALIA E-mail address: pct@ipaaustralia.gov.au Facsimile No. (02) 6285 3929		Authorized officer DALE E. SIVER Telephone No: (02) 6283 2196

INTERNATIONAL SEARCH REPORT

International application No.

PCT/NZ00/00184

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	GB 2 272 984 (Pitney Bowes Inc.) 1 June 1994 Whole document	1-3,11-13,21-23
Y		1-29
X	US 5 150 295 (Mattingly) 22 September 1992 Abstract, columns 1-3	1
Y	EP 838 764 (Samsung Electronics Co. Ltd.) 29 April 1998 Whole document	1-29

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/NZ00/00184

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document Cited in Search Report				Patent Family Member			
US	5953722	EP	838663	JP	101312153	US	5968109
		US	5974419	EP	838771	JP	10253367
		US	6047280				
US	5948040	US	5559707	US	5848373	US	5802492
EP	860787	JP	10240124	US	6107961		
US	5150295	NO	MEMBERS				
EP	838764	CN	1192547	JP	10153951	KR	219161
		US	6125367				
GB	2272984	CA	2110145	GB	93/24556	US	5452203
END OF ANNEX							